

CLAIMS

1. A delivery device comprising:

an outlet portion having substantially bottomed tubular
5 shape or substantially bowl like shape that has an outlet orifice
at the bottom thereof;

a valve element made of an elastic material that, when there
is no liquid pressure exerted thereon from the upstream side, closes
said outlet orifice and/or a flow passage in an outlet portion
10 communicating with said outlet orifice and, when there is a liquid
pressure exerted thereon from the upstream side, deforms and opens
said outlet orifice and/or the flow passage, with the side of said
outlet orifice defined as the downstream; and

a vent hole that communicates with the flow passage which
15 is provided at a position in the upstream of said valve element
via an air filter,

wherein deformation of said valve element is achieved by
a liquid pressure lower than the liquid passing pressure of said
air filter and opening of the outlet orifice and/or the flow passage
20 cannot be achieved by the air passing pressure of said air filter
from outside.

2. A delivery device comprising:

an outlet portion having substantially bottomed tubular
shape or substantially bowl like shape that has an outlet orifice
25 at the bottom thereof;

a valve element made of an elastic material and disposed in said outlet portion that, when there is no liquid pressure exerted thereon from the upstream side, closes said outlet orifice and, when there is a liquid pressure exerted thereon from the upstream side, experiences compressive deformation and opens said outlet orifice, with the side of said outlet orifice defined as the downstream;

a locking member disposed in said outlet portion so as to delimit a flow passage between itself and the inner surface of the outlet portion and fastens said valve element in the upstream, and

a vent hole that communicates with said flow passage which is provided at a position in the upstream of said valve element via an air filter,

wherein compressive deformation of said valve element is achieved by a liquid pressure lower than the liquid passing pressure of said air filter and opening of the outlet orifice and/or the flow passage cannot be achieved by the air passing pressure of said air filter from outside.

3. The delivery device according to claim 2, wherein said valve element and said locking member are integrally formed.

4. A delivery device comprising:

an outlet portion having substantially bottomed tubular shape or substantially bowl like shape that has an outlet orifice

at the bottom thereof;

a valve seat fixed in said outlet portion;

a valve element made of an elastic material in a substantially tubular shape that is fixed on the inner surface of said outlet portion and, when there is no liquid pressure exerted thereon, makes contact with said valve seat from downstream side so as to close the flow passage communicating with said outlet orifice and, when there is a liquid pressure exerted thereon from the upstream side, undergoes compressive deformation so as to open the flow passage between itself and said valve seat, with the outlet orifice side defined as the downstream; and

a vent hole that communicates with said flow passage which is provided at a position in the upstream of said valve element via an air filter,

wherein the compressive deformation of said valve element is achieved by a liquid pressure lower than the liquid passing pressure of said air filter, and opening of the outlet orifice and/or the flow passage cannot be achieved by the air passing pressure of said air filter from outside.

5. The delivery device according to claim 4, wherein said valve element and said outlet portion are integrally formed.

6. A delivery device comprising:

an outlet portion having substantially bottomed tubular shape or substantially bowl like shape that has an outlet orifice at the bottom thereof;

a valve element made of an elastic material and disposed

in said outlet portion that, when there is no liquid pressure exerted thereon from the upstream side, closes said outlet orifice or the flow passage that communicates with said outlet orifice and, when there is a liquid pressure exerted thereon from the upstream side, undergoes expansive deformation so as to open said outlet orifice or the flow passage, with the outlet orifice side defined as the downstream; and

a vent hole that communicates with said flow passage which is provided at a position in the upstream of said valve element via an air filter,

wherein the expansive deformation of said valve element is achieved by a liquid pressure lower than the liquid passing pressure of said air filter, and opening of the outlet orifice or the flow passage cannot be achieved by the air passing pressure of said air filter from outside.

7. The delivery device according to claim 6, wherein said valve element has a valve body that is fixed in said flow passage and a projection formed at the distal end on the outlet orifice side thereof;

the projection at the distal end of said valve body engages with a ridge that is formed on the inner wall of the flow passage, which communicates with said outlet orifice, from the downstream side so as to close said flow passage; and

the valve body undergoes expansive deformation toward downstream side under the liquid pressure from the upstream side

so as to form a clearance between the projection at the distal end of said valve body and the ridge on the inner wall of the flow passage.

8. A delivery device comprising:

5 an outlet portion having substantially bottomed tubular shape or substantially bowl like shape that has an outlet orifice at the bottom thereof;

10 a valve element made of an elastic material and making contact with said outlet portion on the outer surface thereof that, when there is no liquid pressure exerted thereon from the upstream side, closes said outlet orifice and, when there is a liquid pressure exerted thereon from upstream side, undergoes expansive deformation so as to open said outlet orifice, with the outlet side orifice defined as the downstream; and

15 a vent hole that communicates with the flow passage which is provided at a position in the upstream of said valve element via an air filter,

20 wherein the expansive deformation of said valve element is achieved by a liquid pressure lower than the liquid passing pressure of said air filter, and opening of the outlet orifice cannot be achieved by the air passing pressure of said air filter from outside.

25 9. The delivery device according to claim 8, wherein said outlet orifice is delimited by a substantially disk-shaped valve seat that is fixed in said outlet portion and the inner wall surface of the outlet portion that holds said valve seat;

said valve element has a substantially ring-shaped thin-walled portion and causes the thin-walled portion to make contact with said valve seat from the side of the outer surface of said outlet portion so as to close the outlet orifice; and

5 the thin-walled portion of said valve element undergoes expansive deformation under the liquid pressure from the upstream side toward the downstream so as to open said outlet orifice.

10. The delivery device according to claim 9, wherein said valve element and said outlet portion are integrally formed.

10 11. A delivery device comprising:

an outlet portion having substantially bottomed tubular shape or substantially bowl like shape that has an outlet orifice at the bottom thereof;

15 a valve element made of an elastic material having a substantially ring-shaped valve body and a substantially ring-shaped thin-walled portion provided at the distal end of the former, said valve body being fixed in the outlet portion while said thin-walled portion is exposed through said orifice to the outside of the outlet portion;

20 a cylindrical valve element support member that is disposed in said outlet portion so as to delimit the outlet orifice together with said valve element; and

25 a vent hole that communicates with the flow passage which is provided at a position in the upstream of said valve element via an air filter, with the outlet orifice side defined as the

downstream,

wherein said valve element causes the thin-walled portion thereof to make contact with the outer periphery of said valve element support member so as to close the outlet orifice when there is no liquid pressure applied thereto from the upstream side, while
5 said thin-walled portion undergoes expansive deformation so as to open the outlet orifice when a liquid pressure is applied thereto from the upstream side, and

the expansive deformation of said thin-walled portion is
10 achieved by a liquid pressure lower than the liquid passing pressure of said air filter, and opening of the outlet orifice cannot be achieved by the air passing pressure of said air filter from outside.

12. The delivery device according to claim 11, wherein said valve element support member has a flange at a position on the
15 upstream side of the cylindrical portion while the valve body of said valve element makes contact with said flange so as to close the flow passage when there is no liquid pressure applied thereto from the upstream side, and undergoes compressive deformation so as to open the flow passage between itself and said valve element
20 support member when a liquid pressure is applied thereto from the upstream side.

13. The delivery device according to claim 11 or 12, wherein said valve element and said outlet portion are integrally formed.

14. The delivery device according to any one of claims 2
25 to 13, wherein antibacterial treatment has been applied to said

valve element.

15. The delivery device according to any one of claims 2 to 13, wherein antibacterial treatment has been applied to said outlet orifice.

5 16. The delivery device according to any one of claims 2 to 13, wherein a liquid filter is provided at a position in the upstream of said outlet orifice or in the upstream of the position where the flow passage is opened and closed by said valve element.

10 17. A container having the delivery device according to any one of claims 1 to 16, that is fitted at the mouth of a container body.

15 18. The container according to claim 17, comprising a plug that is held slidably in the flow passage of said delivery device or in said container body, while said plug makes contact with the inner wall of the flow passage of said delivery device so as to close said flow passage before the container is put into use.

19. The container according to claim 17 or 18, that is an eye dropper.